

WHAT IS CLAIMED IS:

1 1. A method of trimming a parametric surface, comprising:
2 obtaining a trimming texture based on a trimming curve
3 for the parametric surface; and
4 applying the trimming texture to the parametric surface.

1 2. The method of claim 1, further comprising rendering an
2 image based on the parametric surface and the trimming
3 texture.

1 3. The method of claim 2, wherein said rendering comprises:
2 drawing a plurality of pixels only in a solid portion of
3 the image that is not a trimmed portion.

1 4. The method of claim 2, wherein the trimming texture
2 comprises:
3 a first portion comprising a rendered section of the
4 parametric surface; and
5 a second portion comprising a trimmed section of the
6 parametric surface.

1 5. The method of claim 1 further comprising drawing a
2 plurality of pixels based on an allocation of the trimming
3 texture relative to the parametric surface.

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6. ~~The method of claim 1, wherein obtaining is performed in a pre-rendering process and applying is performed in a run-time process.~~

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7. ~~The method of claim 2, further comprising:
obtaining a material texture; and
drawing the material texture on the parametric surface based on the trimming texture.~~

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8. ~~The method of claim 1, further comprising obtaining the trimming texture from a plurality of trimming curves for the parametric surface.~~

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9. ~~A method of trimming a parametric surface comprising:
obtaining the parametric surface;
obtaining a trimming curve for the parametric surface;
mapping the trimming curve on a trimming texture to create a trimmed section and a rendered section;
obtaining a plurality of polygons approximating the parametric surface; and
rendering the parametric surface based on an application of the trimming texture to the polygons.~~

10. The method of claim 9, comprising:

2 obtaining a material texture for the parametric surface;
 3 and
 4 applying the material texture to a region of the
 5 parametric surface corresponding to the rendered section of
 6 the trimming texture.

1 11. An article comprising a computer-readable medium that
 2 stores instructions for use in trimming a parametric surface,
 3 the instructions for causing the computer to:
 4 obtain a trimming texture based on a trimming curve for
 5 the parametric surface; and
 6 apply the trimming texture to the parametric surface.

1 12. The article of claim 11, further comprising instructions
 2 for causing the computer to render an image based on the
 3 parametric surface and the trimming texture.

1 13. The article of claim 11, further comprising instructions
 2 for causing the computer to render an image by drawing a
 3 plurality of pixels in a solid portion of the image that is
 4 not a trimmed portion.

1 14. The article of claim 12, further comprising instructions
 2 for causing the trimming texture to include:

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3 a first portion comprising a rendered section of the
 4 parametric surface; and
 5 a second portion comprising a trimmed section of the
 6 parametric surface.

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1 15. The article of claim 11, further comprising instructions
 2 for causing the computer to draw a plurality of pixels based
 3 on an allocation of the trimming texture relative to the
 4 parametric surface.

1 16. The article of claim 12, further comprising instructions
 2 for causing the computer to:
 3 obtain a material texture; and
 4 draw the material texture on the parametric surface based
 5 on the trimming texture.

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1 17. The article of claim 11, further comprising instructions
 2 for causing the computer to obtain the trimming texture from a
 3 plurality of trimming curves for the parametric surface.

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1 18. An article comprising a computer-readable medium that
 2 stores instructions for use in trimming a parametric surface,
 3 the instruction for causing the computer to:
 4 obtain the parametric surface;
 5 obtain a trimming curve for the parametric surface;

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6 map the trimming curve on a trimming texture to create a
7 trimmed section and a rendered section;

8 obtain a plurality of polygons approximating the
9 parametric surface; and

10 render the parametric surface based on an application of
11 the trimming texture to the polygons.

1 19. The article of claim 18, further comprising instructions
2 for causing the computer to:

3 obtain a material texture for the parametric surface; and
4 apply the material texture to a region of the parametric
5 surface corresponding to the rendered section of the
6 trimming texture.

1 20. An apparatus for use in trimming a parametric surface,
2 comprising:

3 a memory which stores computer instructions; and
4 a processor that executes the computer instructions to:
5 obtain a trimming texture based on a trimming curve for
6 the parametric surface; and
7 apply the trimming texture to the parametric surface.

1 21. The apparatus of claim 20, further comprising
2 instructions to cause the computer to render an image based on
3 the parametric surface and the trimming texture.

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1 22. The apparatus of claim 21, further comprising
2 instructions for causing the computer to render an image by
3 drawing a plurality of pixels in a solid portion of the image
4 that is not a trimmed portion.

1 23. The apparatus of claim 21, further comprising
2 instructions for causing the trimming texture to include:
3 an first portion comprising a rendered section of the
4 parametric surface; and
5 a second portion comprising a trimmed section of the
6 parametric surface.

1 24. The apparatus of claim 20, further comprising
2 instructions for causing the computer to draw a plurality of
3 pixels based on an allocation of the trimming texture relative
4 to the parametric surface.

1 25. The apparatus of claim 21, further comprising
2 instructions for causing the computer to;
3 obtain a material texture; and
4 draw the material texture on the parametric surface based
5 on the trimming texture.

1 26. The apparatus of claim 20, further comprising
2 instructions for causing the computer to obtain the trimming

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texture from a plurality of trimming curves for the parametric surface.

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27. An apparatus comprising a computer-readable medium that stores instructions for use in trimming a parametric surface, the instruction for causing the computer to:

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obtain the parametric surface;

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obtain a trimming curve for the parametric surface;

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map the trimming curve on a trimming texture to create a

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trimmed section and a rendered section;

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obtain a plurality of polygons approximating the

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parametric surface; and

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render the parametric surface based on an application of

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the trimming texture to the polygons.

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28. The apparatus of claim 27, further comprising

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instructions for causing the computer to:

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obtain a material texture for the parametric surface; and

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apply the material texture to a region of the parametric

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surface corresponding to the rendered section of the trimming

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texture.

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29. A method for use in rendering images from data for an original three-dimensional model, comprising:

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3 obtaining a trimming texture based on a trimming curve
 4 for the three-dimensional model;
 5 applying the trimming texture to the three-dimensional
 6 model; and
 7 rendering an image.

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1 30. The method in claim 29 wherein rendering comprises
 2 drawing a plurality of pixels based on an allocation of the
 trimming texture relative to the three-dimensional model.

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APPENDIX

Let $S(u,v)$ be a vector-valued function that generates the parametric surface.

Let $C_1(t), C_2(t), \dots, C_n(t)$ be vector-valued functions that generate trimming curves for the surface.

Assume the existence of a function, `Tessellate()`, that generates a list of triangles approximating the surface. Also assume that the triangles generated by `Tessellate()` have texture coordinates that correspond to the parameters u and v used to generate the surface points.

Assume the existence of a function, `DrawTexturedTriangles()`, that draws a list of triangles while applying an alpha-channel texture to the triangles. Where the alpha-channel texture is transparent, no pixels will be drawn to the screen.

Let T be an alpha-channel texture whose alpha-channel is initialized to completely opaque.

Once, up-front, for each trimming curve, C_1, C_2, \dots, C_n , draw the curve on T and then fill the trimmed portion of the curve with transparent pixels.

Each time the surface needs to be rendered:

- Call `Tessellate()` to get a list of triangles, L
- Call `DrawTextured Triangles (L, T)` to draw the list of triangles, L , using the alpha-channel texture, T

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